

# Notice of Allowability

Application No.

10/671,297

Examiner

Dennis L. Vautrot

Applicant(s)

VERMA ET AL.

Art Unit

2167

## -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to RCE filed 2/12/2007.
2. ☒ The allowed claim(s) is/are 1-14, 16, 17, 20-22 and 24.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

### Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date See Continuation Sheet
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

Continuation of Attachment(s) 3. Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date: 2/12/2007, 2/28/2007, 3/14/2007.

### **DETAILED ACTION**

1. This Action is responsive to the Request for Continued Examination filed 12 February 2007. After a thorough search and examination of the present application and the prior art made of record, as well as the references cited on the newly submitted IDS, Claims 1 – 14, 16, 17, 20 – 22, and 24 are allowed.

### ***Information Disclosure Statement***

2. The information disclosure statement (IDS) submitted on 12 February 2007 has been received and entered into the record. Since the IDS complies with the provisions of MPEP § 609, the references cited therein have been considered by the examiner. See attached form PTO-1449.

### ***Drawings***

3. The drawings filed on 31 October 2006 are accepted.

### ***Examiner's Amendments***

4. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Art Unit: 2167

5. Authorization for this Examiner's amendment, listed below, was given by telephone by Mr. Stephen Ford (Registration Number 35,139) on 28 February 2007.

6. Please amend the claims as follows:

1. (Currently Amended) A database management system, comprising:

a processor ~~configured to provide~~ing a neighborhood locking scheme for a neighborhood of free space adjacent to and associated with a data item and extending to an adjacent data item, the neighborhood locking scheme concurrently creating both a first locking mode for the data item, while at the same time creating a second locking mode for the neighborhood associated with the data item;

where the first locking mode when first held on the data item determines an associated set of predetermined access restrictions for the data item and determines and associated different set of predetermined access restrictions for the neighborhood associated with the data item;

where the second locking mode when first held on the neighborhood determines the associated set of predetermined access restrictions for the neighborhood and determines the associated different set of predetermined access restrictions for the data item;

wherein the neighborhood locking scheme includes a neighborhood lock mode that grants a first transaction an exclusive lock on a first tuple and a weak lock on the neighborhood associated with the first tuple; and

wherein the neighborhood lock mode grants a second concurrent transaction an exclusive lock on a second tuple located in the neighborhood of the first tuple.

2. (Currently Amended) A database management system, comprising:

a processor ~~configured to provide~~ing a neighborhood locking scheme for a neighborhood of free space adjacent to and associated with a data item and extending to an adjacent data item, the neighborhood locking scheme concurrently creating both a first locking mode for the data item, while at the same time creating a second locking mode for the neighborhood associated with the data item;

where the first locking mode when first held on the data item determines an associated set of predetermined access restrictions for the data item and determines an associated different set of predetermined access restrictions for the neighborhood associated with the data item;

where the second locking mode when first held on the neighborhood determines the associated set of predetermined access restrictions for the neighborhood and determines the associated different set of predetermined access restrictions for the data item;

wherein the neighborhood locking scheme:

allows a non-serializable scan of the data item with a first transaction while allowing a concurrent non-serializable lock on the neighborhood with a second transaction;

Art Unit: 2167

allows a serializable scan of the data item with the first transaction while preventing a concurrent non-serializable lock on the neighborhood with the second transaction;

allows a non-serializable lock on the neighborhood with the first transaction while allowing a concurrent non-serializable scan on the data item with the second transaction; and

allows a non-serializable lock on the neighborhood with the first transaction while preventing a concurrent serializable scan on the data item with the second transaction.

3. (Currently Amended) A database management system, comprising:

a processor ~~configured to provide~~ing a neighborhood locking scheme for a neighborhood of free space adjacent to and associated with a data item and extending to an adjacent data item, the neighborhood locking scheme concurrently creating both a first locking mode for the data item, while at the same time creating a second locking mode for the neighborhood associated with the data item;

where the first locking mode when first held on the data item determines an associated set of predetermined access restrictions for the data item and determines and associated different set of predetermined access restrictions for the neighborhood associated with the data item;

where the second locking mode when first held on the neighborhood determines the associated set of predetermined access restrictions for the neighborhood and

Art Unit: 2167

determines the associated different set of predetermined access restrictions for the data item; and

wherein the neighborhood locking scheme:

allows a first non-serializable lock of the data item with a first transaction while concurrently allowing a second non-serializable lock on the neighborhood with a second transaction;

allows a first serializable lock on the data item with the first transaction while concurrently preventing a second non-serializable lock on the neighborhood with a second transaction;

allows a first non-serializable lock on the neighborhood with the first transaction while concurrently allowing a second non-serializable lock on the data item with the second transaction; and

allows a first non-serializable lock on the neighborhood with the first transaction while concurrently preventing a second serializable lock on the data item with the second transaction.

6. (Currently Amended) A database management system, comprising:

a processor ~~configured to provide~~ing a neighborhood locking scheme for a neighborhood of free space adjacent to and associated with a data item and extending to an adjacent data item, the neighborhood locking scheme concurrently creating both a first locking mode for the data item, while at the same time creating a second locking mode for the neighborhood associated with the data item;

where the first locking mode when first held on the data item determines an associated set of predetermined access restrictions for the data item and determines and associated different set of predetermined access restrictions for the neighborhood associated with the data item;

where the second locking mode when first held on the neighborhood determines the associated set of predetermined access restrictions for the neighborhood and determines the associated different set of predetermined access restrictions for the data item; and

wherein the neighborhood locking scheme includes a neighborhood lock (Xnei) mode that enables a first transaction to lock the neighborhood for inserting a new tuple but prevents the first transaction from locking a tuple associated with the neighborhood.

8. (Currently Amended) A database management system, comprising:

a processor ~~configured to provide~~ing a neighborhood locking scheme for a neighborhood of free space adjacent to and associated with a data item and extending to an adjacent data item, the neighborhood locking scheme concurrently creating both a first locking mode for the data item, while at the same time creating a second locking mode for the neighborhood associated with the data item;

where the first locking mode when first held on the data item determines an associated set of predetermined access restrictions for the data item and determines and associated different set of predetermined access restrictions for the neighborhood associated with the data item;



Art Unit: 2167

where the second locking mode when first held on the neighborhood determines the associated set of predetermined access restrictions for the neighborhood and determines the associated different set of predetermined access restrictions for the data item; and

wherein the neighborhood locking scheme includes a non-serializable end of scan (Snei) lock mode that allows a first transaction to only read the neighborhood while preventing the first transaction from reading or writing a tuple associated with the neighborhood.

16. (Currently Amended) A system for controlling access to data items in a database, comprising:

a processor executing:

means for identifying a neighborhood of free space associated with a data item in the database;

means for providing a first set of access privileges for the data item according to a lock mode held on the data item;

means for providing a second set of access privileges for the neighborhood associated with the data item and determined by the lock mode held on the data item;

means for using a lock mode first held on the data item for determining the first set of access privileges for the data item and the second set of access privileges for the neighborhood;

means for using the lock mode first held on the neighborhood for determining the first set of access privileges for the data item and the second set of access privileges for the neighborhood; and

means for gaining access for modifying the neighborhood by asserting a neighborhood lock (Xnei) on the data item and then restricting to the data item according to a predetermined set of lock modes associated with the Xnei.

20. (Currently Amended) A computer readable medium containing instructions that ~~when executed by~~ are executing on a computer comprising:

providing a neighborhood locking scheme for a neighborhood of free space adjacent to and associated with a data item and extending to an adjacent data item, the neighborhood locking scheme concurrently creating both a first locking mode for the data item, while at the same time creating a second locking mode for the neighborhood associated with the data item;

causing the first locking mode when first held on the data item to determine an associated set of predetermined access restrictions for the data item and determine an associated different set of predetermined access restrictions for the neighborhood associated with the data item;

causing the second locking mode when first held on the neighborhood to determine the associated set of predetermined access restrictions for the neighborhood and determine the associated different set of predetermined access restrictions for the data item;

causing a non-serializable scan of the data item with a first transaction while allowing a concurrent non-serializable lock on the neighborhood with a second transaction;

causing a serializable scan of the data item with the first transaction while preventing a concurrent non-serializable lock on the neighborhood with the second transaction;

causing a non-serializable lock on the neighborhood with the first transaction while allowing a concurrent non-serializable scan on the data item with the second transaction; and

causing a non-serializable lock on the neighborhood with the first transaction while preventing a concurrent serializable scan on the data item with the second transaction.

21. (Currently Amended) A computer readable medium containing instructions that ~~when executed by~~ are executing on a computer comprising:

providing a neighborhood locking scheme for a neighborhood of free space adjacent to and associated with a data item and extending to an adjacent data item, the neighborhood locking scheme concurrently creating both a first locking mode for the data item, while at the same time creating a second locking mode for the neighborhood associated with the data item;

causing the first locking mode when first held on the data item to determine an associated set of predetermined access restrictions for the data item and determine an

Art Unit: 2167

associated different set of predetermined access restrictions for the neighborhood associated with the data item;

causing the second locking mode when first held on the neighborhood to determine the associated set of predetermined access restrictions for the neighborhood and determine the associated different set of predetermined access restrictions for the data item;

causing a first non-serializable lock of the data item with a first transaction while concurrently allowing a second non-serializable lock on the neighborhood with a second transaction;

causing a first serializable lock on the data item with the first transaction while concurrently preventing a second non-serializable lock on the neighborhood with a second transaction;

causing a first non-serializable lock on the neighborhood with the first transaction while concurrently allowing a second non-serializable lock on the data item with the second transaction; and

causing a first non-serializable lock on the neighborhood with the first transaction while concurrently preventing a second serializable lock on the data item with the second transaction.

22. (Currently Amended) A computer readable medium containing instructions that ~~when executed by~~ are executing on a computer comprising:

providing a neighborhood locking scheme for a neighborhood of free space adjacent to and associated with a data item and extending to an adjacent data item, the neighborhood locking scheme concurrently creating both a first locking mode for the data item, while at the same time creating a second locking mode for the neighborhood associated with the data item;

causing the first locking mode when first held on the data item to determine an associated set of predetermined access restrictions for the data item and determine an associated different set of predetermined access restrictions for the neighborhood associated with the data item;

causing the second locking mode when first held on the neighborhood to determine the associated set of predetermined access restrictions for the neighborhood and determine the associated different set of predetermined access restrictions for the data item; and

enabling a first transaction to lock the neighborhood for inserting a new tuple but preventing the transaction from locking a tuple associated with the neighborhood.

### ***Reasons For Allowance***

7. The following is an examiner's statement of reasons for allowance:

In the Examiner's Office Action for Final Rejection of 16 October 2006, the 35 U.S.C. § 102, rejections were primarily based on the reference of **Mohan** (U.S. Patent 6,009,425). As discussed in the prior office action, **Mohan** appears to show separate locks on the neighborhood and the tuple, but not the type of locks defined, nor a functional equivalent, to what is described in the

Art Unit: 2167

current application. This is important because the new types of locks allow for greater concurrency for non-serialized processing than was previously available using previously defined locking combinations. The combinations of locks, as described in Figure 7 of the drawings was particularly persuasive in showing the novelty of the invention. In the 16 October 2006 office action, the Examiner objected to claims 2, 3, 6 – 9, 13, 15, 18 and 20 – 24 as having allowable subject matter. Applicant has amended each independent claim to include previously objected to material, or incorporated independent claims in with dependent claims to overcome the rejections of the Office Action dated 16 October 2006. The claims are now believed to be in condition for allowance.

Specifically, the claims relating to **the newly created locks, exclusive non-serializable lock (Xn), exclusive neighborhood lock (Xnei), shared non-serializable lock (Sn), and Shared neighborhood lock (Snei) were not able to be located in prior art.** Furthermore, the **locking scheme for granting a first transaction an exclusive lock on a first tuple and a weak lock on the tuple's neighborhood, and further granting a second transaction (a concurrent transaction), an exclusive lock on a second tuple located in the neighborhood, is novel.**

After further review of the search results previously conducted and Applicant's most currently amended claims, and consideration of the above Remarks, the Examiner is persuaded that the prior art made of record does not teach the subject matter combined in the elements of each of the independent claims 1, 2, 3, 6, 8, 10, 13, 16, 20, 21, and 22 as described above.

Additionally, thorough consideration was given to the newly cited references submitted on the IDSs after the Allowance from 13 November 2006. These were dated (2/12/2007, 2/28/2007,

Art Unit: 2167

and 3/14/2007). Examiner is still persuaded that the references do not teach the subject matter combined in the elements of each of the independent claims.

An expanded and update search for the prior arts on EAST database and on domains has been conducted. The prior art searched and investigated in the database and domains does not fairly teach or suggest the teaching of the claimed subject matter as reflected by the combined elements in the independent claims 1, 2, 3, 6, 8, 10, 13, 16, 20, 21, and 22.

The dependent claims in the groups (4-5 & 24), (7), (9), (11, 12, 14), and (17), depending on claims 3, 6, 8, 10, and 16, respectively, are also distinct from the prior art for the same reason.

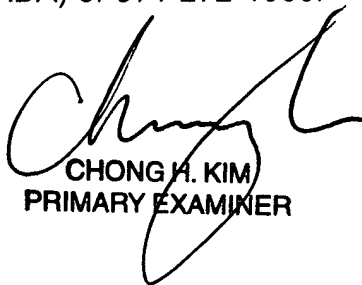
8. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis L. Vautrot whose telephone number is 571-272-2184. The examiner can normally be reached on Monday-Friday 9:00-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Cottingham can be reached on 571-272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Dv  
16 March 2007

  
CHONG H. KIM  
PRIMARY EXAMINER